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IS 3081 (1994): Microscopes - General purposes - Dimensions and marking [PGD 22: Educational Instruments and Equipment]



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भारतीय मानक

सूक्ष्मदर्शी यंत्र — सामान्य प्रयोजनों के लिए —
आयाम और चिह्नांकन

(पहला पुनरीक्षण)

Indian Standard

**MICROSCOPES — GENERAL PURPOSES —
DIMENSIONS AND MARKING**

(*First Revision*)

UDC 535.822

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Optical and Mathematical Instruments Sectional Committee had been approved by the Light Mechanical Engineering Division Council.

This standard deals with the more important dimensions of microscopes which are necessary for interchangeability. It may be necessary, in special cases, that dimensions other than those specified in this standard may have to be adopted for one reason or the other, such cases are not covered in this standard.

This standard was originally published in 1965. Since then, considerable progress has been made at international and national level. In this revision the requirements in respect of screw thread for objectives have been aligned with ISO 8038 : 1985 'Optics and optical instruments — Microscope — Screw threads for objectives'. In addition to this, the following other modifications have been made :

- a) Distance of image plane from the top edge of tubes has been modified as 12.5 ± 0.5 mm,
- b) Tolerances have been specified on length of condenser receptacle and condenser, and
- c) Thread details of objectives and the nosepiece of the body tubes have been shown in Fig. 2 and 3.

In the formulation of this standard, due weightage has been given to the need for international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country. These considerations led the Sectional Committee to base this standard on ISO 8038 : 1985. Assistance has also been derived from the following standards published by Deutsches Institut Für Normung (DIN) :

DIN 58881 : 1956 Microscopes, oculars — Dimensions for interchangeability

DIN 58882 : 1956 Microscopes, condensers, filters — Dimensions for interchangeability

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

MICROSCOPES — GENERAL PURPOSES — DIMENSIONS AND MARKING

(First Revision)

1 SCOPE

1.1 This standard specifies the important dimensions for the ocular, body tube, objective, condensers, mirror and filters for general purposes microscopes and their marking. Only those dimensions which are necessary for interchangeability have been specified.

2 DIMENSIONS

2.1 The dimensions of the various components of microscope shall be as given in Fig. 1. The dimensions include any finish coating such as, electroplating, anodizing or painting.

2.1.1 The mechanical tube length for the microscopes shall be 160 mm nominal. The actual value of tube length may vary but the tube length shall always be the equivalent of a mechanical 160 mm.

2.1.2 The length of the body tube, where the ocular is fitted, shall be so designed as to be able to minimize internal reflection.

2.1.3 The tolerance on the fitting diameter of the condensers and the condenser receptacle has been specified for an arrangement where the condenser is retained in the receptacle only by friction. Larger tolerance may be allowed where other arrangements, such as, spring loaded clamps are provided. The design shall always be such that the upper surface of the condenser does not project over the stage surface.

2.2 The dimensions of the screw threads for the objective and the nosepiece of the body tubes shall be as illustrated in Fig. 2, 3 and Table 1.

Table 1 Dimensions of the Screw Threads for the Objective and the Nosepiece of the Body Tube
(All dimensions in millimetres.)

Dimensions for		External Diameter	Pitch Diameter	Core Diameter		Calculated Play Between Internal and External Threads		Allowances	Tolerance
External Thread	Max	D 20.396	D ₂ 19.944	D ₁	19.492	—	Maximum play	0.076	0.076
	Min	20.320	19.868		19.416	Minimum play		0	
Internal Thread	Max	d 20.274	d ₂ 19.822	d ₁	19.370	0.046	0.198	-0.046	0.076
	Min	20.198	19.746		19.294	—		-0.012 2	

NOTE — See also Fig. 2 and 3.

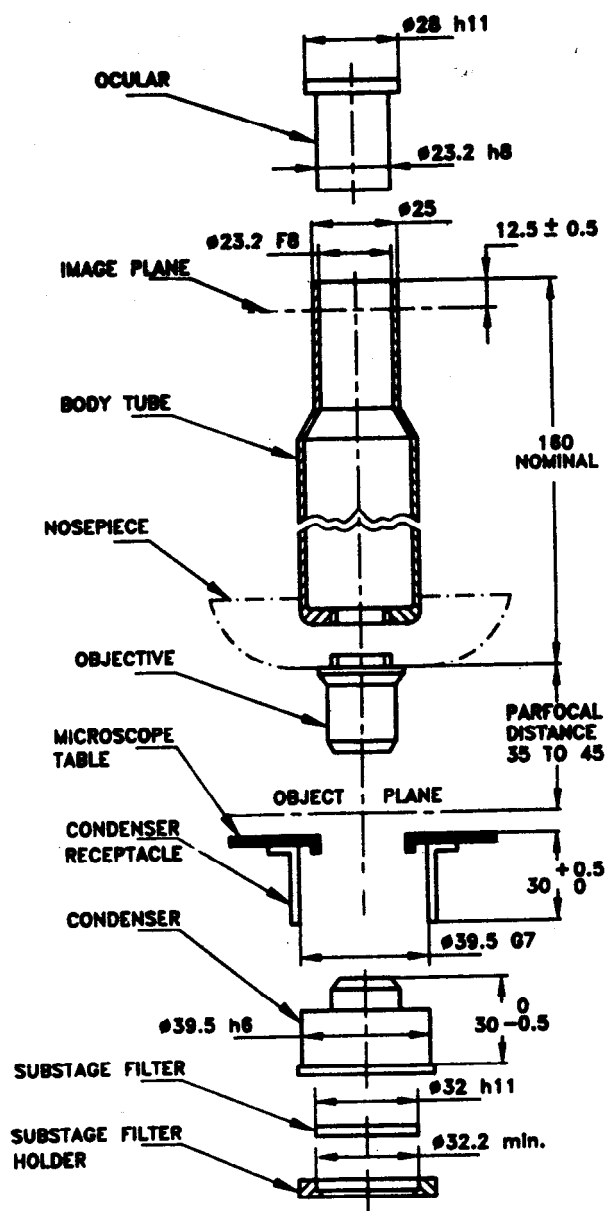
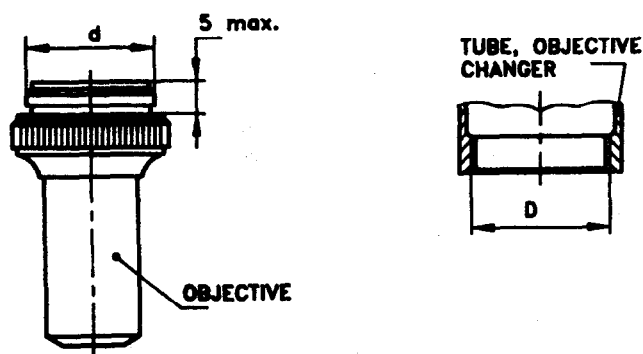
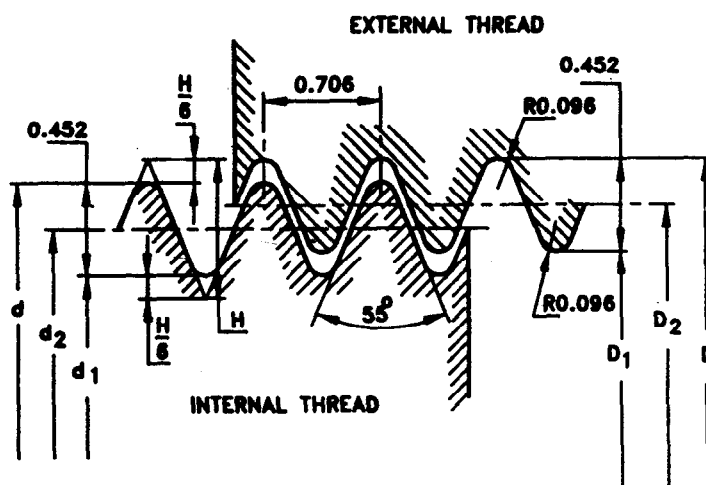


FIG. 1 DIMENSIONS FOR GENERAL PURPOSES MICROSCOPES



All dimensions in millimetres.

FIG. 2 OBJECTIVE AND TUBE OBJECTIVE CHANGER



All dimensions in millimetres.

Fig. 3 INTERNAL AND EXTERNAL THREADS

2.2.1 The length of the threaded portion of the objective, inclusive of the undercut, shall be 5 mm Max (see Fig. 2).

NOTES

- 1 The use of this screw thread is recommended for all microscopes unless other fittings are required for optical for design reasons.
- 2 Objectives which are not optically compatible with other existing microscope systems are not restricted to the maximum thread length of 5 mm.

2.3 The reflecting mirror for the microscope, inclusive of the mount, shall have a diameter of 51^{+0}_{-1} mm.

2.4 Dimensions which have not been specified in this standard shall be at the discretion of the manufacturer.

3 MARKING

3.1 Marking for the Objective

Each objective shall be engraved with the following information:

- a) Indication of the source of manufacture;
- b) Magnification and numerical aperture, for example, $10 \times / 0.25$;
- c) Optimum tube length and cover slip thickness for which the objective is correct (only when they are other than 160 mm and 0.17 mm, respectively);
- d) Immersion objective shall be engraved with the word 'Oil' or 'Water', as the case may be; and
- e) Character of the objective if other than achromat, shall be engraved, for example:

PL = Plan achromatic,
 FL = Fluorite,
 APO = Apochromatic,
 PH = Phase contrast, and
 INT = Interference.

3.1.1 The marking for objectives suitable for use in polarized light shall be in red colour. For all other cases, it may be black or white.

3.2 Marking for the Ocular

The following information shall be marked on the ocular in a position where it shall be visible when the ocular is fitted in the microscope:

a) Manufacturer's name or trade-mark, and

b) Magnification, for example, 10 ×.

NOTE — Magnification is calculated from the formula:

$$\text{Magnification} = \frac{250}{\text{Equivalent focal length in millimetres}}$$

3.2.1 The ocular shall be regarded as of the Huygens type unless otherwise stated and marked accordingly:

COMP = Compensating
 W.F. = Wide field
 O = Orthoscopic
 PROJ = Projection
 RAMSDEN = Ramsden

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Amendments Issued Since Publication

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